

as in the past, long and tedious preliminary investigations" (p. 3). Homogeneity for such a purpose cannot be secured by mere similarity in publication of results; indeed, this very process tends to cover up vital differences of detail, and it is to be feared that, unless these can be unearthed again, the work will suffer in accuracy.

There is an appendix at the end of the volume professing to give a bibliography of the already large literature on the Eros campaign, but containing no reference to the *Monthly Notices* or other English work. Is not this rather a strange oversight?

H. H. TURNER.

#### NOTES.

BRITISH science has been honoured by the award of the Nobel prize for physics to Lord Rayleigh, and the prize for chemistry to Sir William Ramsay, K.C.B., F.R.S. Prof. Pavloff, of the Military Academy of Medicine at St. Petersburg, has been awarded the prize for physiology. The distribution of the prizes took place at Stockholm on December 10 in the presence of King Oscar and the Royal Family, foreign ministers and members of the Cabinet, and many leading representatives of science, art, and literature. After speeches had been delivered by the vice-president and other representatives of the Nobel committee, and of the Academies of Science, Medicine, and Literature, King Oscar personally presented Lord Rayleigh, Sir William Ramsay, and Prof. Pavloff with their prizes, together with diplomas and gold medals. The sum of money attaching to each prize amounts to about 7825*l*. The distribution of the prizes was followed by a banquet, at which the Crown Prince presided; and among the company were Prince and Princess Charles, Lord and Lady Rayleigh, Sir William and Lady Ramsay, and M. and Mme. Pavloff. Count Mörner proposed the health of Prof. Pavloff, Prof. Petterson that of Sir William Ramsay, and Prof. Hasselberg that of Lord Rayleigh. On Monday Sir William Ramsay delivered a lecture on argon and helium at the Academy of Sciences, and King Oscar gave a dinner party to the prize winners. On Tuesday Lord Rayleigh delivered a lecture at the academy on the density of gases. Both lectures were highly appreciated and greatly applauded. It is announced that Lord Rayleigh proposes to present to Cambridge University the value of the Nobel prize for physics awarded to him.

SIR NORMAN LOCKYER, K.C.B., F.R.S., has been elected a corresponding member of the Imperial Academy of Sciences at St. Petersburg.

THE Lavoisier gold medal, which has been awarded by the French Academy of Sciences to Sir James Dewar, F.R.S., for his researches on the liquefaction of gases, was founded in 1900, to be given, without distinction of nationality, at such times as the French Academy should elect in recognition of eminent services rendered to chemistry by scientific men. The present is the first occasion on which the medal has been awarded to a British man of science.

THE Wislicenus memorial lecture will be delivered before the Chemical Society by Prof. W. H. Perkin, F.R.S., on Wednesday, January 25, at 8.30 p.m.

MR. A. SILVA WHITE, formerly secretary to the Royal Scottish Geographical Society, and editor of the *Scottish Geographical Magazine*, has been appointed assistant secretary of the British Association, and has already taken up the duties of the post.

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PROF. BOYCE, of Liverpool University, has proposed to the Liverpool Chamber of Commerce a scheme for the establishment of a commercial museum and bureau of scientific information. The object is to correlate the various scientific forces in the city in order to utilise them for commercial advantage. The scheme has been referred to a committee of the Chamber of Commerce.

ON the invitation of the director, Dr. J. J. Dobbie, F.R.S., and Mrs. Dobbie, a large and representative gathering assembled in the Royal Scottish Museum, Edinburgh, on Monday evening, December 12, to celebrate the jubilee of the museum. The museum embraces three departments—natural history, art and ethnography, and technology, under their respective keepers, Dr. Traquair, F.R.S., Mr. D. J. Vallance, and Dr. Alex. Galt. In the natural history department the collection of fossil fish is one of the most important in the world. Other special features of this department are the hall of British zoology and the zoological type collection, the aim of the latter being to illustrate the bearing of comparative anatomy on the classification of the animal kingdom. The ethnographical collection is one of the most extensive of its kind, and contains many specimens brought home by explorers of the end of the eighteenth and early part of the nineteenth centuries. The technological department contains a large and fine collection of machine and engineering models, most of them made in the museum workshops, together with mining and metallurgical specimens and models. There is also a large collection of economic botany attached to this department. The collections of H.M. Geological Survey of Scotland are housed in the museum, and with these is associated the Heddle-Dudgeon collection of Scottish minerals, which has been described as the finest collection of the minerals of any one country in existence. The museum is supported by a Parliamentary grant, and is under the Scotch Education Department, which was represented at the conversazione by Sir Henry Craik, K.C.B., and Mr. Macdonald, assistant secretary.

A MEETING was held in the geological lecture theatre of the Owens College, Manchester, on December 8, at which it was resolved to establish a Manchester University Geologists' Association. The object of the association is to afford a centre of social reunion for the discussion of geological subjects. Prof. Boyd Dawkins was elected president, Mr. B. Hobson and Mr. Winstanley vice-presidents, Mr. W. J. Hall secretary, and Mr. O. B. Leigh treasurer.

A SHORT time ago Dr. Doyen claimed to have discovered the microbe of cancer, and to have prepared with it a curative serum for the disease. A committee was appointed to investigate Dr. Doyen's claims (see NATURE, October 27, p. 631), and, according to the daily Press, has now reported favourably on them. The *Standard*'s correspondent telegraphs, however (December 14), that the committee has not yet arrived at any conclusion.

ON the recent retirement of Sir William Macgregor from the Governorship of Lagos, the Liverpool School of Tropical Medicine decided to mark its appreciation of his valuable services to the cause of health and sanitation by raising a fund, to which Sir Alfred Jones contributed 500*l.* and Mr. John Holt 200*l.* It has been decided to expend this fund on two medical expeditions to the west coast of Africa, one in charge of Prof. Boyce, who, with Dr. A. Evans and Dr. H. H. Clarke, sailed from the Mersey on Wednesday, the other under Colonel Giles. These expeditions will

study the various health problems presented by the districts they visit, the distribution of biting insects, and related matters.

A DEMONSTRATION of the Pollak-Virag high-speed writing telegraph was given on December 9 at the Carlton Hotel in the presence of the Austro-Hungarian Ambassador. The Pollak-Virag high-speed telegraphic system was described upwards of three years ago in a detailed article published in NATURE for May 2, 1901, and readers may be referred to that account for particulars of the instruments used. Very high speeds—reaching 100,000 words an hour—were reported as having been attained in America in 1901 by this system, using several perforating machines to prepare the message being sent; but it now appears that these estimates were too high. The postal authorities in Hungary in recent experiments carried out between Budapest and Pozsony, a distance of some 218 kilometres, with two copper telephone wires of 3 mm. diameter, secured the transmission of 45,000 words an hour. In another series of experiments, conducted between Berlin and Königsberg, a maximum transmission of 40,000 words an hour was attained over a distance of 710 kilometres with wires 4.5 mm. in diameter. It is stated that our Post Office department is about to carry out some trials of the Pollak-Virag system.

THE performances of an intelligent horse—"Clever Hans"—at Berlin two or three months ago attracted much attention. In a letter which appeared in NATURE of October 20 (vol. lxx. p. 602) the Rev. J. Meehan pointed out that the performances of the horse were much the same as those of the horse "Mahomet" shown at the Royal Aquarium twelve or thirteen years ago, and depended entirely upon the animal's observation of movements of the trainer or the tones of his voice. Much the same opinion has been reached by a commission of psychological experts, headed by Prof. Stumpf, of Berlin University, that has subjected "Clever Hans" to a scientific examination. The conclusion arrived at is that the horse is not capable of independent thought. According to the Berlin correspondent of the *Daily Chronicle*, Prof. Stumpf found that this horse is gifted with remarkable powers of observation, which four years of patient and skilful treatment have developed. When asked a question "Hans" knows he has to beat with his hoof in reply, but he does not know when to cease beating until he detects some movement on the part of the person questioning him. The commission expresses the opinion that, so far as Herr von Osten, the owner, is concerned, these movements are given involuntarily, and are sometimes of so imperceptible a nature as to be undetected, save by highly trained human observers. There has been no trickery, says Prof. Stumpf, but, on the other hand, there have been no reasoning powers on the horse's part. The whole secret is in von Osten's skill, patience, and judicious reward, and, on "Hans's" part, in keen powers of observation.

VISITORS to the Zoological Gardens in the Regent's Park will miss the old Indian rhinoceros "Jim," which had been a denizen of the menagerie since July 25, 1864, on which date it was presented to the society by the late Mr. A. Grote. It died on December 7, after having been out of health for many months. Such a long sojourn in captivity in this country is probably unparalleled for an animal of this kind. As a statement has appeared in the Press that the skin might perhaps be mounted in the British (Natural History) Museum, it may be well to state that His Highness the Maharaja of Kuch-Behar recently presented the skin of a wild specimen of the great

Indian rhinoceros to the museum, which has been set up, and is exhibited. The "Zoo" specimen will therefore not find a home in the national collection.

THE December number of the *Century Magazine* contains a most interesting account, by Mr. G. H. Grosvenor, of the new method of purifying water—both in small quantities and when stored in large reservoirs—by means of blue vitriol (copper-sulphate). It has long been known that copper is fatal to bacteria, but the fear has hitherto been that the amount required to effect the destruction of such organisms would likewise be injurious to man. Dr. G. T. Moore has, however, announced in an American official publication that he can employ copper in such a diluted form as to be quite harmless to the higher forms of animal, and yet sufficiently potent to destroy the germs of cholera and typhoid, as well as mosquito larvæ, in a few hours. The method of introducing the copper-salt into the water is fully explained in the article. It may be added that the treatment is stated to be equally efficacious and safe for sterilising milk. As an illustration of the effects of copper in destroying bacteria, it is mentioned that such organisms are never found on copper coins, although abundant on those of silver, and it is mentioned that artisans in copper-works are immune to bacterial diseases. Whether we have been wise in abolishing the old-fashioned copper tea-kettle is one of the questions raised by the new operations.

THE discovery of the existence of an anterior rudimentary pair of gills in the Continental fresh-water crayfish *Astacus fluviatilis*, which is not present in the common *A. pallipes* of the Thames, was described by Prof. Lankester in NATURE of January 21 (vol. lxxi. p. 270), and is recorded in the November issue of the *Quarterly Journal of Microscopical Science* by Miss M. Moseley, who appears to have inherited her father's love for biological studies. The other four papers in the same number are of a very technical nature, the longest and perhaps the most important being a detailed account by Mr. J. W. Jenkinson of the maturation and fertilisation of the egg of the axolotl (*Ambystoma tigrinum*). More general interest attaches, however, to the article by Prof. L. Rogers on the development of flagellated organisms or trypanosomes from the protozoic parasites found in the spleen in cases of cachexial fevers and certain other diseases. Of the two remaining articles, the one by Dr. J. Rennie discusses the so-called epithelial islets in the pancreas of bony fishes, while the second, by Dr. H. G. Fowler, is devoted to the description of the anatomy of a radiolarian of the genus *Gazeletta*.

IN an article entitled "A Flamingo City," which appears in the December number of the *Century Magazine*, Mr. F. M. Chapman, of the American Museum of Natural History, gives a graphic and well illustrated account of one of the great breeding-places of the American flamingo in the Bahamas. Although previous observers, both in those islands and in Europe, have published descriptions of flamingo colonies, and have refuted the old error that the birds sat straddle-wise on their nests, the author claims to be the first to have seen nestling flamingoes in their native haunts, and likewise to have brought the camera to bear on one of the breeding-places of these birds. Flamingoes, as Mr. Chapman remarks, are more brightly coloured than any other large bird, and their gregarious habits and the open nature of their resorts are admirably suited to bring their gorgeous hues into prominence. The visit to the nesting-grounds was made at the latter end of May, when both eggs and young birds were to be found in the nests.

At first the birds—estimated at 2000 in number—rose in a flock, and fears were entertained that they would permanently forsake their nests, but after a time—despite the erection of a “blind” for the camera—they returned in a body. The sight of such an army of large birds, both in flight and when marching, is described as magnificent and imposing, if not, indeed, appalling. The young remain in the nest for about three days, and for the first three weeks after leaving it feed like ordinary birds. By that time, however, the beak has attained its characteristic flexure, and the young birds then search for their food with the lower mandible upwards. Molluscs of the genus *Cerithium* form almost the sole food of the Barbados species. It is sincerely to be hoped that a movement to prevent these “rookeries” from being raided by the plumage-hunter will be attended with success.

IN vol. iv. of the *Bulletin* of the Imperial Botanic Garden at St. Petersburg, Mr. J. Palibin describes the plankton which he collected in Barents Sea, and also gives a historical *résumé* of other collections made in the Arctic Ocean. In a series of letters Mr. Boris Fedtschenko communicates the botanical observations made during a journey through the Sir Daria region of Turkestan.

IN a pamphlet entitled “Notes on the Commercial Timbers of New South Wales,” Mr. J. H. Maiden describes the principal woods, their characters, and uses. The information is primarily suited to practical men who supply or use timber in the colony. The majority of the timbers are hard woods, and different species of *Eucalyptus* give iron-barks, stringy barks, varieties of box, mahogany, and gum. The timbers recommended in lieu of pine are white beech, *Gmelina Leichhardtii*, a genus of the order Verbenaceæ, and red cedar, *Cedrela australis*, and rosewood, *Dysoxylon Lessertianum*, both included in the Meliaceæ.

THE establishment of “biologic forms” of species of *Erysiphaceæ* and *Uredineæ* is based upon the restricted powers of infection of the spores upon allied species of the host plant. But the immunity of a species of the host plant is not absolute, because, as pointed out by Mr. E. S. Salmon in No. 3 of vol. ii. of the *Annales Mycologici*, another host plant may act as a bridging species. Thus the form of *Erysiphe graminis* which grows on *Bromus racemosus* will infect *Bromus hordeaceus*, but will not infect *Bromus commutatus*, although the spores found on *Bromus hordeaceus* will infect *Bromus commutatus*. If spores from *Bromus racemosus* are sown on *Bromus hordeaceus*, then the spores produced on *Bromus hordeaceus* as a result of that sowing are found to be capable of infecting *Bromus commutatus*.

THE daily weather report issued by the Meteorological Office on Tuesday, December 6, showed that on the morning of that day the winds and sea in the Channel were still very heavy, and, further, that a rapid fall of the barometer at Scilly pointed to the approach of a fresh disturbance. This storm developed very rapidly, and by 2h. p.m. a deep disturbance lay over Dorsetshire, and another to the north of the Helder. These disturbances were accompanied by very heavy rainfall, amounting in twenty-four hours to 2.25 inches at Cuxhaven, 1.25 inch at St. Aubins (Jersey), and 0.94 inch in London, while severe thunderstorms occurred generally in Devon and Cornwall. Much damage to property is reported from various districts, and in parts of Dorsetshire a veritable tornado occurred; rain and hail fell in torrents, accompanied by heavy thunder and lightning. At Beaminster roofs and trees suffered severely;

the path of the storm was well defined, and, as is usually the case in these local whirlwinds, was limited to a very small area. The region of heavy rainfall over the country generally was sharply defined on its northern side; at Nottingham and Spurn Head no rain was reported to the Meteorological Office on the morning of December 7

A VOLUME of monthly wind charts for the South Atlantic Ocean, prepared by the marine branch of the Meteorological Office, has just been published by the Hydrographic Department of the Admiralty. The region covered extends from the equator southward to the 65th parallel, and from the 20th meridian of east longitude to the 90th of west longitude, so that a portion of the Pacific is included. Nearly a million sets of observations, extending over a period of forty-five years, have been used. The winds have been discussed in areas of 5° of latitude by 5° of longitude, and the results are exhibited by means of roses showing the relative frequency and strength at the sixteen even points of the compass. The distribution of mean atmospheric pressure is shown by means of isobaric lines, and the mean air temperature by isotherms, while along the African and American coasts are numerous notes bearing upon the characteristic climatic features of the various months. A striking feature on every chart is the area of high barometric pressure covering the whole of the area between Africa and the east coast of America, its central space being usually more on the western side of the ocean, as is the case with the anticyclone of the North Atlantic. The wind circulation of the South Atlantic is associated with its dominating high pressure system. On the eastern and northern portions of the ocean the south-east trade is very constant, is never interrupted by storms, nor attains the force of a gale. On the western side the winds are more variable, but gales are very rarely experienced northward of the 35th parallel. Except near the land fogs seldom occur northward of the 30th parallel, and the south-western part of the ocean is the only region where ice is ordinarily met with. Statistics of the rainfall at a number of places within the area of the charts show that the annual amount ranges from 0.31 inch at Walfisch Bay and 1.54 inches at Serena (Coquimbo) to 93.41 inches at Pernambuco and 100.63 inches at Valdivia. It may be recalled that at the Cambridge meeting of the British Association Commander Hepworth read a paper on the results of the discussion of the observations for these charts.

IN No. 22 of the *Physikalische Zeitschrift* Messrs. Elster and Geitel reply to Mr. J. R. Ashworth's recent letter to NATURE (vol. lxx., p. 454) suggesting that the human breath may be considered as a source of the ionisation of the atmosphere. Their measurements of the conductivity of air charged with ordinary human breath show that such air is not more conducting than ordinary air. On the other hand, the breath of a person who has been working continually with radium preparations has decided ionising power, and the nature of the ionisation shows that it is due to the emanation of radium.

NEARLY all the physicists who have been approached hitherto by the *Revue Scientifique* in the course of its inquiries as to the existence of the *n*-rays have unequivocally stated their inability to observe the effects which these rays are alleged to produce. It is therefore particularly interesting to note in the *Revue* for November 26 that M. D'Arsonval has been able to reproduce these effects in many instances, and to show that they are not due merely to thermal causes. M. Mascart is stated jointly to have observed with him the same phenomena. M. Poincaré,

although himself unable to verify the existence of the radiations, adversely criticises Prof. Wood's objections. M. Weiss, from his failure to observe the rays, simply concludes that he was physically unfitted for such observations.

PART xii. of the *Transactions* of the Royal Dublin Society consists of an investigation by Mr. Richard J. Moss of the state in which helium exists in pitchblende. The total quantity of helium in a sample of pitchblende was 0.107 c.c. per gram, and of this 1.17 per cent. was liberated by simply grinding the mineral in a vacuum. The quantity of carbon dioxide separated by completely decomposing the mineral was 4.686 c.c. per gram, of which only 0.0085 per cent. was obtainable by grinding. As a similar proportion of the total occluded carbon dioxide can be separated from calcite, in which the gas is undoubtedly present in minute cavities, by simply pulverising the crystals, it is probable that the whole of the carbon dioxide of pitchblende, and possibly the helium also, are present similarly occluded. It is evident that the proportion of the gases liberated by roughly grinding must necessarily be only a small proportion of the total volume.

THE Christmas number of *Photography*, published by Messrs. Iliffe and Sons, Ltd. (1s. net), is restricted to many kinds of work with the camera which can be accomplished indoors during the winter months. It might be said further to deal with the lighter side of photography as well, as will be judged by reading the second portion of this number. Part i., by Mr. C. J. Harrison, deals with the working up of negatives and prints for the removal of mechanical and other defects from negatives. The methods and dodges employed are, as the author states, the outcome of his own experience, but nevertheless they are interesting reading, and may prove serviceable to many photographers. The illustrations accompanying the text and chosen to represent various stages of these methods are also well worth examination. In part ii. Mr. W. L. F. Wastell discourses on bye-paths of photography. Here the reader is made acquainted with methods for producing what may be termed "freak" photographs. Thus we have illustrated examples of the so-called "spirit" photograph, distortions due to the object being too near to the camera, two images of the same person in one picture, combination portraits, silhouettes, and many others of a similar character. The supplement to this number consists of designs, covering sixteen pages, of photographic mounts to serve as Christmas cards.

THE articles in the October number of the Johns Hopkins Hospital *Bulletin* (xv., No. 163) are mainly of medical interest. Dr. Packard, however, writes an interesting account of some famous quacks, including Valentine Greatrakes, who claimed the healing touch for the King's evil in the seventeenth century, no other than Robert Boyle testifying to his powers; Joshua ("Spot") Ward, who discovered a cheap way of making oil of vitriol; and John St. John Long, who devised a famous liniment which possessed not only curative powers, but also revealed hidden disease, and from his practice is said to have derived 13,000l. a year.

MR. W. B. CLIVE has published a revised and enlarged edition of "First Stage Building Construction," by Mr. Brysson Cunningham.

MESSRS. DAWBARN AND WARD, LTD., have published in their "Home Worker's" series a booklet by Mr. R. H. S. Williams with the title "How to Build a Bicycle," and one on "How to Build a Petrol Motor," by Mr. J. F. Gill.

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THE separate parts (parts i.-vi.) of "A School Geometry," by Messrs. H. S. Hall and F. H. Stevens, which have been reviewed in these columns from time to time, have been published together in one volume by Messrs. Macmillan and Co., Ltd., at 4s. 6d.

A FOURTH edition of Prof. Olof Hammarsten's "Text-book of Physiological Chemistry" has been published by Messrs. John Wiley and Sons, New York (London: Messrs. Chapman and Hall, Ltd.). This issue is an authorised translation by Prof. John A. Mandel from the author's enlarged and revised fifth German edition.

THE 1904 issue of the "Year-book of the Scientific and Learned Societies of Great Britain and Ireland" has now been published by Messrs. Charles Griffin and Co., Ltd. This is the twenty-first annual issue of a useful list of organisations for the advancement of science, literature, and art, and of work done year by year. Comprehensive as the compilation is, it is not quite complete, for there appears to be no reference either to the Sociological Society or to the Geographical Association.

*Erratum.*—In the inscription of Fig. 5 (p. 135) of the article on "Invar" in last week's *NATURE*, "a 2 km. wire" should read "a 24 m. wire."

#### OUR ASTRONOMICAL COLUMN.

##### RELATIONS BETWEEN SOLAR AND TERRESTRIAL PHENOMENA.

—In a paper communicated to the Royal Society of New South Wales, Mr. H. I. Jensen, of Sydney University, discusses the more recent data concerning sun-spot frequencies and the occurrence of volcanic outbursts, earthquakes and climatic variations, with the view of illustrating further the dependence of the terrestrial upon the solar phenomena.

In a previous paper communicated to the same society in June, 1902, he arrived at the conclusion that the maxima of volcanic and seismic activity coincided, in point of time, with the sun-spot minima, but the discussion of the later data has led him to a confirmation of the views expressed by Sir Norman Lockyer, viz. that the maximum activity of the terrestrial takes place at both the minima and the maxima of the solar phenomena. His observations show, however, that the action at sun-spot maxima is less marked than, and of a different character to, that which takes place at the minima.

The differential action of lunar attraction is also discussed, and although the author concludes that this cause is only one of secondary importance, he shows that volcanic outbursts and earthquakes seem to occur most frequently at those times when the moon is in perigee.

In discussing the connection existing between solar and meteorological variations, Mr. Jensen refers to the work performed in this direction by Sir Norman and Dr. Lockyer, and in general agrees with their results, although he inclines to the belief that the epochs of sun-spot *maxima* are generally the epochs of excessive rainfall. Further, he strongly insists upon the necessity of attaching more importance to geographical position when considering the prevailing meteorological conditions of any place (*Proc. Roy. Soc. New South Wales*, vol. xxxviii.).

**SUN-SPOT SPECTRA.**—In No. 4, vol. xx., of the *Astrophysical Journal* Father Cortie brings together the results of all the sun-spot spectra observations made at the Stonyhurst College Observatory during the period 1883-1901.

Using a Browning automatic spectroscope containing twelve 60° prisms, the widened lines in the region B-D of the solar spectrum were picked out, and the intensity of their relative widening recorded on an arbitrary numerical scale. The present catalogue results from 5486 individual observations of 349 lines, and the results generally confirm the observations made at South Kensington as recorded by Sir Norman Lockyer in a paper ("On the Relation between the Spectra of Sun-spots and Stars") recently communicated to the Royal Society, viz. that vanadium and titanium are the elements chiefly affected in sun-spot spectra.